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CONSTRUCTION ELEMENT, PARTICULARLY ONE MADE OF WOOD

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(56) Documents taken into consideration for evaluating the patentability:
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Construction Element, Particularly One Made of Wood

Because of the high level of high-rise construction, there is a demand for simpler construction components which can be used in such buildings. In particular, construction elements and methods to manufacture them are to be developed that require the use of less material while having approximately the same load bearing capacities as the construction elements used today.

Therefore, a construction element, particularly one made of wood, is proposed according to the invention, which has a first plank with a cut, elevated and recessed area-presenting, edge, and a second plank with a cut, elevated and recessed areas-presenting, edge, where the two planks are in contact with each other with at least some of their elevated areas.

The manufacture of corresponding construction elements from main planks consists in cutting the latter along their width diagonally, so that adjacent cuts are at an inclination with respect to each other, forming trapezoid parts with small and broad ends. Pairs of trapezoid parts are aligned with respect to each other so that the small parts are in contact with each other and connected to each other. In this manner, hollow spaces are produced between adjacent pairs of parts.

The invention is explained in greater detail below with reference to the figures which show embodiment examples.

Figure 1 is a perspective representation of a wooden plank, where one can see the cut applied according to the invention.

Figure 2 shows a perspective representation of a wooden plank according to the invention with another cut.

Figure 3 shows a perspective representation of another possibility for cutting the wooden plank according to the invention.

Figure 4 shows a drawn-out perspective representation of the connections of the planks cut from the wooden plank according to Figure 1.

Figure 5 shows a perspective representation of an assembled construction element with upper and lower struts.

Figure 6 shows a perspective representation of a construction element, which has been assembled from the cut wooden plank according to Figure 2, with upper and lower struts.

Figure 7 shows a cross section along a line 7-7 of Figure 5.

Figure 8 shows a cross section along line 8-8 of Figure 5.

Figure 9 shows a cross section similar to Figure 7 through another embodiment example.

Figure 10 shows a drawn-out perspective representation of the connection of the planks according to Figure 3 to form a construction element using upper and lower struts.

The construction element according to the invention is manufactured, for example, by cutting a wooden plank, which has a length "l," a width "w," and a thickness "d," as shown in Figure 1. The cut is made along the line 2 (Figure 1), so that an upper plank 3 and a lower plank 4 are produced, each presenting elevated surfaces 5 (Figure 4) and recessed surfaces 6, which are separated from each other by the separation "x." The planks 3 and 4 are separated from each other and then aligned with respect to each other in such a manner that at least some of the elevated surfaces 5 of the plank 3 are applied against elevated surfaces 5 of the plank 4. After this alignment of the planks 3 and 4, the latter are connected to each other and also cut, so that aligned end surfaces are produced (Figure 4). The struts 9 and 10 can be attached by means of an adhesive or with nails (Figure 5).

The course of cut 2 can be chosen from a large number of different shapes, provided that elevated and recessed surfaces are produced on each plank 3 and 4. The courses of the cuts can be, for example, triangular, sinusoidal, rectangular, trapezoid, or combinations of such courses. The course of the cut is determined to a certain degree by the application purpose of the construction element. If the construction element will be a structural element later, then it must be possible to withstand loads generated by bending forces, tensile forces, shearing forces, pressure and similar actions. The load bearing capacity can be influenced by the depths "x" of the cuts and the separation "y" between the recessed points as well as by the curvature of the cut.

The course of the cut 2 according to Figure 1 is preferred in the case of the continuous manufacture of such construction elements by means of known cutting devices, for example, milling machines or circular keyhole saws. The course of the cut also leads to identically large and identically shaped smooth elevated surfaces 5 on the planks 3 and 4. As a result, the planks can be easily connected to each other with an adhesive. If the course of the cut becomes more complicated and presents a larger number of angular cuts, then it is particularly appropriate to use cutting installations, such as lasers, which at this time are not yet used commercially. In a certain preferred embodiment example of the invention, the elevated surfaces 5 have the same height and a planar surface area, in which the planks 3 and 4 are connected to each other. The result of this arrangement is an improved connection of the planks and an increased rigidity and stability of the entire construction element.

A substantial advantage of the construction element according to the invention is provided by its increased rigidity compared to the original wooden plank, from which a construction element was manufactured without additional material. Another substantial advantage is the fact that the finished construction element presents openings 7, through which electrical lines, ducts for air conditioning installations, etc., can be led, without having to cut openings into the construction element. As a result, the total costs and the time required for building a structure are reduced.

In an embodiment example, the wooden plank according to Figure 1 has a length of 3.60 m, a height of 15.3 cm and a thickness of 5.1 cm. The separation "x" between the elevated and the recessed surface was 4.5 cm, where the beginning of the cut was at a distance of 5.4 cm from the upper edge 8 of the plank 1. The two planks 3 and 4 were aligned as shown in Figure 4 and then joined together with an adhesive, resulting in a building component whose width was increased by 40%. A test of this construction element resulted in an increase in the load bearing capacity of approximately 40% compared to the original wooden plank. In addition, the construction element

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manufactured in this manner had approximately the same loading bearing capacity as a continuous plank of the same width.

In another embodiment example, the construction element additionally presented an upper strut 9 and a lower strut 10 (Figure 5). The upper strut 9 is attached to the edge 9 by nails, with adhesives or similar materials. In the same manner, the lower strut is connected to the bottom edge of the plank 4. If a greater load bearing capacity is desired, then a metal strip 11 can be arranged between one or two struts and the associated plank 3 or 4. In the represented embodiment example, a groove is milled into each of the planks 3 and 4, into which the metal strip 11 fits tightly (Figure 7). In another embodiment example, the upper strut 9 and the lower strut 10 can also be milled out to a depth corresponding to that of the planks 3 and 4. In this manner, the metal strips 11 were held by means of the planks 3 and 4, without requiring any additional gluing or attachment, although such additional gluing or attachment is preferred. The upper and lower struts can be attached by means of nails or with adhesive or similar materials to the planks 3 and 4. As one can see in the cross-sectional representation in Figure 8, the metal strips extend over the entire length. This is naturally not absolutely required, the metal strips can also be shorter.

Figure 9 shows a cross section through another embodiment example with a metal strip 11, where the planks 3 and 4 are not milled out, instead the metal strip is placed simply on the upper edges of the planks, and the struts 9 and 10 are reduced by milling to such a width and depth that they receive both the corresponding metal strip 11 and also a part of the plank 3 or 4.

As already explained above, the planks 3 and 4 are separated and aligned so that the elevated areas are adapted to each other. The planks can then be connected to each other and cut off at the ends.

In another embodiment example of the invention, the wooden plank 1 can be cut along the course of a cut 2' according to Figure 3. The result is the production of trapezoid blocks 12A, 13A, 13B and 12B. It is preferred to cut the block 13A in such a manner that the width of the lower surfaces 14 is the same. Accordingly, the width of the upper surfaces 15 should be the same. Likewise, the blocks 13B are cut in such a manner that the lower surfaces 22 are identical in size and the upper surfaces 21 have the same size and shape. In a preferred embodiment example, the surfaces 14 and 22 have the same size and shape, and the surfaces 15 and 21 have the same dimensions and shapes. In this case, the blocks 13A and 13B can be interchanged,

which facilitates the manufacture of the construction element. Furthermore, it is advantageous to cut the wooden plank 1 in such a manner that the blocks 12A and 12B can be interchanged, that is the upper surfaces 19 and 20 have the same size and shape, and the lower surfaces 24 and 25 are identical in size. The trapezoid blocks are then arranged on a support 16 (Figure 10), where the inclined surfaces 17 are adjacent and face each other. The support 16 preferably consists of a thin strip of wood or of another rigid material, for example, steel. The blocks 13A are attached to the support 16. In the same manner, the blocks 13B are aligned and attached to a support 18. Then, the blocks 13A and 13B are connected to each other at their small upper surfaces with an adhesive or similar material, so that interstices are produced. Such a construction element has approximately twice the width of the original plank 1 and approximately twice the rigidity of such a plank.

In a preferred embodiment example, the blocks 13A and 13B have the same size, and preferably the plank 1 is cut in such a manner that the block 12A has a small surface 19, whose width is approximately half the width of the small end surface 15 of the block 13. At the same time, the broad end surfaces of the blocks 12A should be half as wide as the width of the broad end surface 14 of the block 13A. The block 12B should have the same dimensions as the block 12A, where the small end 20 of the block 12B has the same width as the end 21 of the block 13B. In this embodiment example (Figure 10), the construction element can be assembled in such a manner that, if the entire plank 1 is used, aligned ends are obtained. Again, the metal strips described above can be used. In particular, the supports 16 and 18 can be milled out, so that grooves similar to those in Figures 7 and 9 are produced. In the same manner, the surfaces 14 and 22 of the trapezoid surfaces can be modified by milling to receive the metal strip 11 in Figure 7 in the depicted manner.

CLAIMS

1. Construction element, particularly one made of wood, characterized in that the first plank (3) with a cut, elevated and recessed areas-presenting, edge, and a second plank (4) with a cut, elevated end recessed areas-presenting, edge, are in contact with each other with at least some of their elevated areas.

2. Construction element according to Claim 1, characterized in that a metal strip (11) is applied to the edge of at least one of the planks (3; 4.), which edge is opposite the cut edge.

3. Construction element according to Claim 1 or 2, characterized in that the planks, in each case, consist of a number of trapezoid blocks, whose smaller ends form the elevated area and whose broader ends are connected to each other.

4. Construction element according to one of Claims 1-3, characterized by a strut, which is connected to an edge of at least one plank, which edge is opposite the cut edge, where a metal strip is optionally located between said strut and the edge.

5. Method for the construction of a construction element from an individual, rectangular wooden plank, characterized in that the wooden plank is cut for the formation of two planks, each with elevated and recessed areas, in the longitudinal direction, the elevated areas of the two planks are aligned with each other, and the planks are connected to each other.

6. Method according to Claim 5, characterized in that the wooden plank is cut diagonally with respect to its width, so that adjacent cuts face each other for the formation of trapezoid parts, and the smaller ends of the trapezoid parts, which form the elevated areas, are connected to each other.

7. Method according to Claim 5 or 6, characterized in that all the elevated areas of each planks are given the same height.

8. Method according to Claim 7, characterized in that the elevated areas have planar surfaces.

9. Method according to one of Claims 5-8, characterized in that struts are attached to the cut edges of opposite edges of the planks.

10. Method according to Claim 9, characterized in that a metal strip is attached between the strut and the associated edge of the plank.

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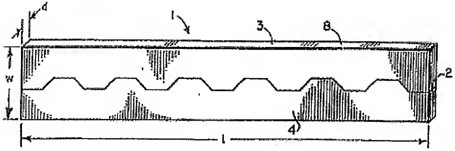

FIG. 1.

FIG. 2.

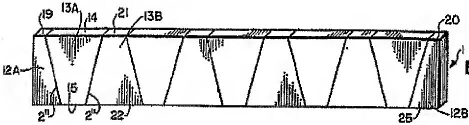

FIG. 3.

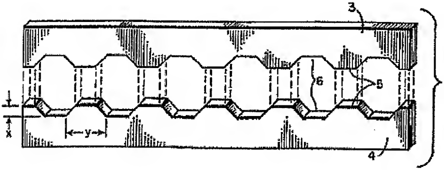

FIG. 4.

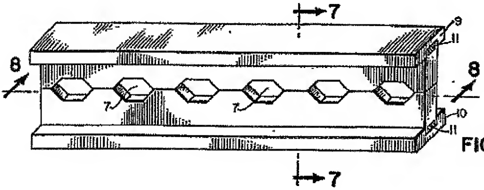

FIG. 5.

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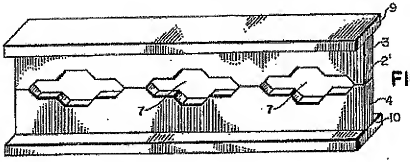

FIG. 6.

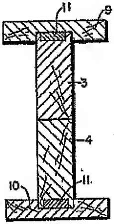

FIG. 7.

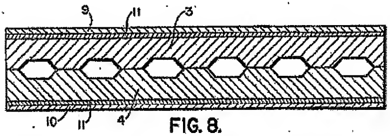

FIG. 8.

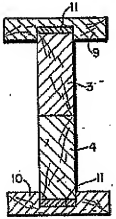

FIG. 9.

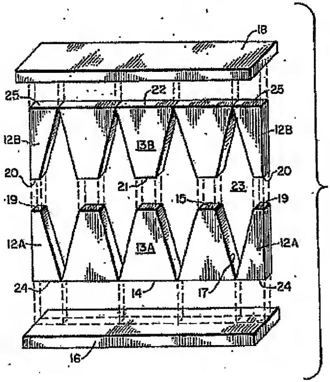

FIG. 10.

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